

## SOME INTERESTING SPECIES IN THE COASTAL FISH FAUNA OF USTICA ISLAND (MEDITERRANEAN SEA)

by

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**ABSTRACT.** - A study on the coastal fish assemblage inhabiting the marine reserve of Ustica Island was carried out from 1994 to 1997 by means of two visual census techniques. The occurrence of species such as *Sphyræna viridensis*, *Sparisoma cretense*, *Lappanella fasciata*, *Scorpaena maderensis*, *Thorogobius ephippiatus*, *Gobius vittatus* and *Caranx crysos* within the censused fish fauna of Ustica is of particular interest providing relevant information on these species, concerning biogeographic aspects, habitat preference and some ecological and behavioural features. The utility of visual census techniques for *in situ* ecological studies on coastal fishes is pointed out.

**RÉSUMÉ.** - Quelques espèces intéressantes de la communauté ichthyologique côtière de l'Île d'Ustica (Mer Méditerranée).

Deux techniques de recensement visuel ont été utilisées pour étudier la communauté ichthyologique côtière de la réserve marine de l'Île d'Ustica depuis 1994. Parmi les espèces recensées à Ustica, la présence de *Sparisoma cretense*, *Sphyræna viridensis*, *Lappanella fasciata*, *Scorpaena maderensis*, *Thorogobius ephippiatus*, *Gobius vittatus* et *Caranx crysos* est particulièrement intéressante du point de vue faunistique et biogéographique et elle a permis de recueillir des informations sur l'écologie et l'éthologie de ces espèces. Les résultats soulignent l'utilité des techniques de recensement visuel dans les études *in situ* des espèces de poissons côtiers.

**Key-words.** - Coastal fishes, MED, Ustica Island, Marine reserve, Visual census.

Ustica is a remote small volcanic island (8 km<sup>2</sup> of surface) located 36 nautical miles off the northern coast of Sicily and surrounded by abyssal grounds deeper than 2,000 m. Established in 1986, the Reserve of Ustica is the first Italian marine park of wide extent (16,000 ha).

In the framework of the research programme "Study of the fish community of the Natural Marine Reserve of the Ustica Island", pluriannual visual census surveys were carried out by ICRAM in order to investigate faunistic and ecological features of the fish assemblages of coastal waters of Ustica, as reported by Vacchi *et al.* (1998).

Previous data on the composition of fish fauna of Ustica were provided only by De Cristofaro (1970), who reported a list of fish species obtained from fishing captures and underwater sightings.

In this study we describe the occurrence in the Ustica coastal waters of some interesting species, namely *Sphyræna viridensis* Cuvier, 1829, *Sparisoma cretense* (Linnaeus, 1758), *Lappanella fasciata* (Cocco, 1833), *Scorpaena maderensis* Valenciennes,

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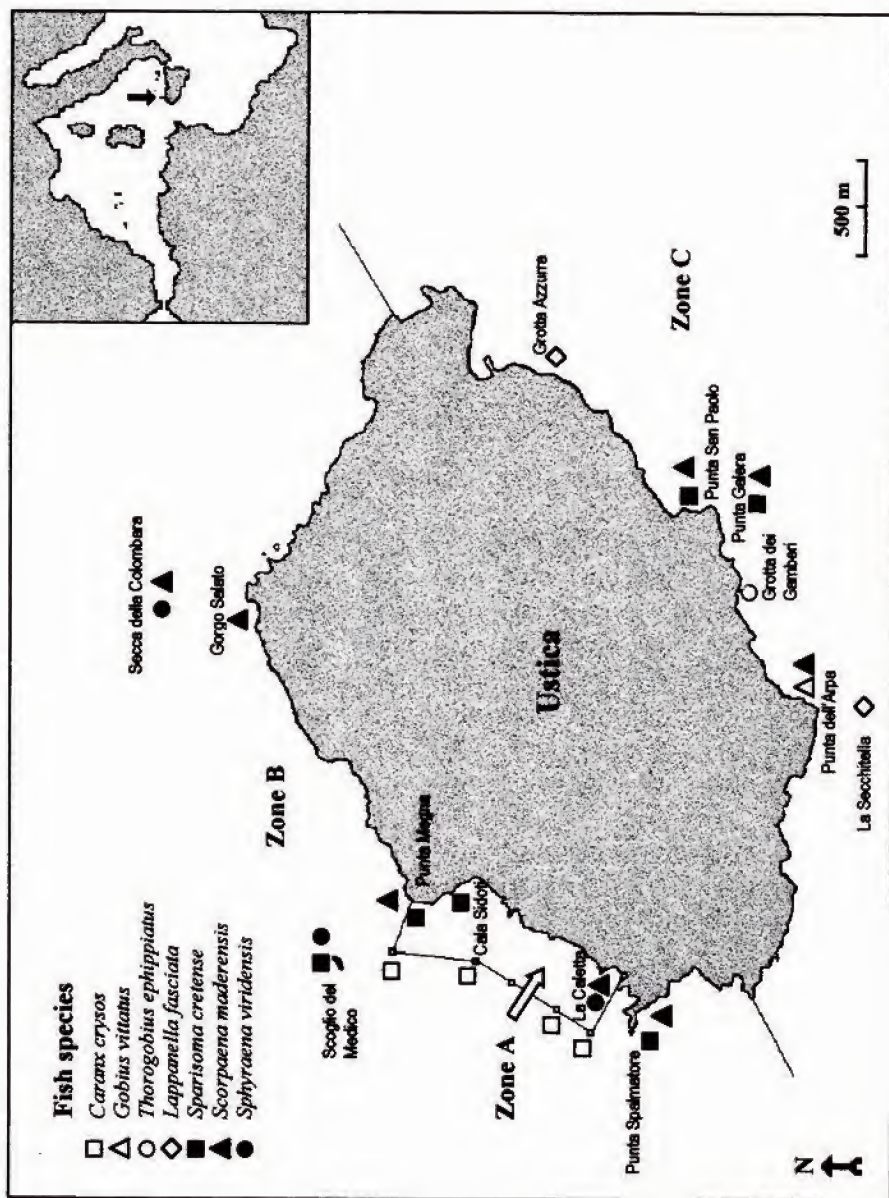


Fig. 1. - Localities of underwater sightings off Ustica Island.



1833, *Thorogobius ephippiatus* (Lowe, 1839), *Gobius vittatus* Vinciguerra, 1833 and *Caranx crysos* (Mitchill, 1815). In particular, we provide information on depth distribution, habitat characteristics, behavioural aspects and colour pattern of the above species.

## MATERIALS AND METHODS

Visual census surveys were carried out from May 1994 to September 1997. The *in situ* observations were performed at several sites located along the coasts of Ustica, as shown in figure 1, by using the strip transect and the random course techniques, according to the non-destructive methodology proposed by Harmelin-Vivien *et al.* (1985). The transects were performed by SCUBA diving at three depth ranges: 3-5 m (shallow transects), 10-15 m (intermediate transects) and 25-30 m (deep transects). Each transect covered a standardised area of 250 m<sup>2</sup>. The random courses were performed by snorkelling near the coastline (between 0 and 3 m depth, each course lasting for 15 min) and by SCUBA diving (within 30 m depth).

The size of sighted specimens was referred to 4 size classes (small, medium, large and very large), on the basis of the maximum length reported in literature (Fischer *et al.*, 1987). An additional size class (juvenile) was used for very small specimens often coming from a recent recruitment phase. During all censuses, bottom features of the investigated zone, namely substratum type, rugosity and slope were noted.

## RESULTS

### *Sphyraena viridensis*

Sightings of *S. viridensis* took place always in spring and summer for three consecutive years (from 1995 to 1997). At two sites of zone B, namely the "Secca della Colombara" and the "Scoglio del Medico", the observed specimens, most of them of relevant size (1 m TL or more), were often grouped in large shoals. This species was also censused at shallow depth during a course by snorkelling performed in zone A.

### *Sparisoma cretense*

A single red coloured specimen of *S. cretense* of large size was firstly observed in December 1994 at "Punta Galera" (Calafiore, pers. comm.). After this first record, we observed a small light-green individual (10 cm TL) in August 1995 at the same location, at a depth of 12 m. Subsequently, a group of 9 adults in olive-green livery (25-30 cm TL) was observed in May 1996 at "Punta Megna" in shallow waters (5-6 m depth), on a hard bottom with gentle slope covered by photophilic algae. In summer 1996, two large-sized individuals were censused in a shallow transect at "Cala Sidoti", and four large specimens, three showing a red livery and one a greyish livery, were observed at "Punta Megna" in a random course by snorkelling. In both cases, *S. cretense* occurred on hard substrates with photophilic algae characterised by medium rugosity and gentle slope. In March 1997, a medium-sized specimen was censused in a shallow transect at "Punta Spalmatore", whereas in summer 1997 two large individuals were observed at "Punta Megna" at shallow depth (3-5 m). Another large olive-green specimen was sighted at "Scoglio del Medico" (rocky bottom with steep slope) and a small-sized specimen was recorded in a deep transect (28 m) at the "Punta San Paolo" sampling station on *Posidonia oceanica*. The latter

specimen was 7-8 cm TL and its livery was light grey and the eyes showed a pale-yellow margin.

### *Lappanella fasciata*

*L. fasciata* was observed during three deep dives in summer 1995. One medium sized specimen (6-7 cm TL) was sighted at "Grotta Azzurra" site, along a rocky slope 40 m deep characterised by large massive sponges (*Cliona* spp.) and bryozoans (*Porella cervicornis*). Two specimens were observed at "la Secchitella", a large submerged rock covered with gorgonians (*Paramuricea clavata*, *Eunicella cavolini*, *E. singularis*) which rise from a deep (50 m) sandy bottom to 40 m depth. The smallest individual (about 7 cm TL) was hiding amongst the *E. singularis* colonies, the largest (12 cm TL) was hovering countercurrent with some swallowtail sea perches (*Anthias anthias*), one meter over the gorgonians' tips. Another specimen was observed at "Secca della Colombara", on a rocky bottom placed at 45 m depth covered with *P. clavata* and a large colony of anthozoan *Gerardia savaglia*.

All the specimens observed in Ustica had the same colour pattern described by Sartoretto *et al.* (1997), but the spot on the upper part of the caudal peduncle, black in the smaller specimens, was always brown and sometimes almost invisible in the larger individuals.

### *Scorpaena maderensis*

During the first year of the research programme, some small-sized scorpionfishes, characterised by deep reddish vertical bands on the body, were recorded as *Scorpaena* sp. A subsequent taxonomic analysis on specimens collected in spring 1996, allowed us to assign these specimens to *S. maderensis*.

After the first identification, *S. maderensis* was censused in most of the sampling sites, always at shallow stands (lesser than 7 m depth). All the observed specimens were recorded on hard substrate, both on rocky bottoms with photophilic algae, rich in crevices and with different slope and, in a lesser extent, on hard bottom with pebbles characterised by gentle slope. Moreover, both young and adults seemed to require the same habitat features. During summer 1997, this species appeared particularly abundant at "Secca della Colombara", a shallow rocky bank off the northern sector of the Island exposed to a strong hydrodynamics. In this site we registered the smallest of the censused fishes (about 3 cm TL).

### *Thorogobius ephippiatus*

This gobiid was repeatedly observed during summer 1995 in a single location, a vast cave called "Grotta dei Gamberi" (the Shrimps Cave), located in the southern sector of the Island at 42 m depth. The large swarms of the pandalid shrimp *Plesionika narval* inhabiting the cave suggested its name.

### *Gobius vittatus*

One specimen of about 3 cm TL was observed at "Punta dell'Arpa" at 46 m depth, on a hard bottom covered by macroalgae.

### *Caranx crysos*

In May 1996, one small specimen of *C. crysos* was observed near one of the buoys delimiting the integral zone of the marine reserve (Fig. 1). In August of the same



year, a number ranging from 1 to 30 specimens were censused near several buoys. The size of these individuals ranged between 2 and 7 cm TL.

## DISCUSSION

Data from literature on the geographic distribution and on some ecological habits of the presented species are reported as follows.

Some information on the distribution of *Sphyaena viridensis* in the northern region of the Western Mediterranean were supplied by Miniconi (1980) and, more recently, by Relini and Orsi Relini (1997). The latter authors stated that *S. viridensis* has been for many years confused with congeneric *S. sphyaena* in Mediterranean fishes catalogues; however, *S. viridensis* can be distinguished from the other barracuda species by some unambiguous characters (e.g., the cross bars on the flanks, the large size).

In the Mediterranean Sea, *Sparisoma cretense* is commonly distributed in the Eastern basin and along the Northern African coasts (Bini, 1968; Papaconstantinou, 1992), whereas in the Western basin it was only recorded off Marseille, Nice, Valencia (Lozano Rey, 1952) and Balearic Islands (Riera *et al.*, 1995). This parrot-fish is quite common in the Southern coasts of Italy (Tortonese, 1975; Fischer *et al.*, 1987), conversely few records were collected in the Northern ones: Bini (1968) reports the catch of a single specimen at Venice (Northern Adriatic Sea) and Bianchi and Morri (1994) recently pointed out its occurrence at the Island of Giglio (Northern Tyrrhenian). *S. cretense* reaches a maximum total length (TL) of 50 cm (commonly from 10 to 30 cm TL) and it shows a marked sexual dichromatism. Rocky and sandy bottoms with seagrass patches are the preferred habitats of this species (Bini, 1968; Tortonese, 1975).

*Lappanella fasciata* is a not common small labrid which inhabits deep rocky areas, generally below 100 m depth (Bini, 1968; Bauchot and Quignard, 1973; Matallanas, 1979; Michel *et al.*, 1987; Quignard and Pras, 1986; Charbonnel, 1990; Miniconi *et al.*, 1990). It was sighted for the first time by SCUBA divers in 1993, off Marseille (Sartoretto *et al.*, 1997), and subsequently, in the Ligurian Sea off Portofino Promontory and on banks facing Vado Ligure, between 30 and 60 m depth (Boyer, unpubl. data).

*Scorpaena maderensis* is a poorly known species distributed on the littoral rocky bottoms of some areas of Mediterranean Sea, such as South-eastern Spain, Sicily, Greece (Ionian and South Aegean) and Lebanon (Tortonese, 1975; Kaspiris, 1976; Economidis and Daoulas, 1981; Hureau and Litvinenko, 1986; Lanfranco, 1993). This scorpionfish attains a maximum size of 14 cm and preferentially inhabits the rocky coasts of the islands between 20 and 40 m depth (Bini, 1968).

The leopard goby *Thorogobius ephippiatus* has been recorded from various Mediterranean localities, where it seems confined in the shallow caves between 5 and 40 m depth (Tortonese, 1975; Escoubet and Murgia, 1981; Charbonnel, 1990).

*Gobius vittatus* is a poorly known little gobiid (3 cm TL) recorded in the Aegean Sea (Dardanelli Strait), along the coasts of Tavolara Island (Sardinia, Italy), Spalato (Adriatic Sea) and Melilla (Marocco) from 15 to 65 m depth (Bini, 1968; Tortonese, 1975). This gobiid has been also reported by Harmelin-Vivien and Francour (1992) around the Island of Ischia (Italy) and the catch of a single specimen has been performed by Kaya *et al.* (1990) near Bodrum (Turkey).

As regards to *Caranx crysos*, Tortonese (1975) refers that this thermophilic species is mainly distributed in the Eastern basin, although it was caught also in the Southern

part of the Western basin. Differently, Fischer *et al.* (1987) report that *C. crysos* is present in the whole Mediterranean except for the Adriatic Sea and the coasts of Turkey. This species reaches a maximum total length of 70 cm and it inhabits preferentially the littoral waters (Fischer *et al.*, 1987).

Our sightings of the above mentioned species in the coastal zone of Ustica Island provide new data about their geographical distribution as well as ecological features. All these species were not mentioned in the fish fauna check-list of Ustica proposed by De Cristofaro (1970), which however reported the presence of barracudas belonging to *Sphyræna sphyræna*. By contrast, we ascribed all the specimens censused during our surveys to *S. viridensis*, on the basis of colour pattern (e.g., the cross bars on the flanks). Moreover, among Mediterranean barracudas, only *S. viridensis* is known to reach the sizes observed in our censuses (Relini and Orsi Relini, 1997). The report of *S. sphyræna* by De Cristofaro (1970) must be considered a possible misidentification of *S. viridensis*, because of the confusion between the two species in the past (Relini and Orsi Relini, 1997).

The parrot-fish *S. cretense* was mostly observed at relative shallow stands, lower than 12 m depth, except for one small-sized specimen, with a peculiar livery, recorded on *Posidonia oceanica*. Therefore, this species seemed to prefer shallow rocky substrates with photophile macroalgae, as observed off Cadix by Otero and Galeote (1996). Other authors (Bini, 1968; Tortonese, 1975) also reported this species on soft bottoms, which lack in the coastal zone of Ustica. Many censused individuals were in pairs or in groups composed by males and females, stressing the gregarious behaviour of this species. In any case, the occurrence of specimens of different sizes leads to hypothesize the existence of a stable and well structure population of *S. cretense* at Ustica.

*L. fasciata* was always censused on rocky habitats with gorgonians between 40 and 50 m depth (lower limit of our dives), according to recent sightings in Northern Mediterranean Sea (Sartoretto *et al.*, 1997; Boyer, unpubl. data). Only one specimen was observed at Ustica in a slightly degraded bottom without gorgonians ("Grotta Azzurra"). The behaviour of the individual observed at "La Secchitella", swimming well above the substratum with the planktivorous fish *Anthias anthias*, disagrees with the other observations, during which *L. fasciata* usually moved very close to the bottom or to the gorgonians.

As for *Scorpaena maderensis*, our results are consistent with those of Riera *et al.* (1995), who report that littoral crevices and cavities along shallow waters (0.8-15 m depth) represent the preferred habitat of this species. As for the bottom slope, it does not seem to affect the distribution of specimens and, in terms of ecological requirements, no difference between young and adults has been found.

Our record of *T. ephippiatus* in the deep cave at Ustica confirms its tendency to inhabit this peculiar habitat in the Mediterranean Sea. Outside the Mediterranean this species commonly dwells hard substrata rich in shelters, whereas, when an overlap with *Gobius cruentatus* occurs, it also inhabits muddy soft sediments (Wilkins and Myers, 1992).

The occurrence of only one specimen of *G. vittatus* makes difficult to draw speculations on the distribution and habitat preference of this species. As reported by Bini (1968), *G. vittatus* inhabits rocky or detritic bottoms deeper than 15 m, whereas one specimen was caught by Kaya *et al.* (1990) on a bottom covered by algae at about 35 m depth. Further sightings were made by Harmelin-Vivien and Francour (1992) around Ischia Island (Italy) on *P. oceanica* beds at about 20 m depth, and by Zander and Nieder (1997)



off Banyuls-sur-Mer (France), at relatively shallow stands and in an ecotone habitat between rockwalls and sandy bottoms. Thus, this species can inhabit several types of habitat, mainly at intermediate or deep stands.

As regards *C. crysos*, we only observed juveniles probably belonging to last reproductive event. The specimens, swimming near buoys, showed a tygmotropic effect typical of pelagic fish species. In this respect, juveniles of this species have usually been observed near FADs (Fish Attracting Devices) and an increasing number of specimens have been caught along the Western coasts of Sicily in the last years (D'Anna and Badalamenti, pers. comm.). Also Riera *et al.* (1995), who recorded *C. crysos* at the Balearic Islands, suggest the possibility of an expanding distribution of the species in the Western Mediterranean.

Data collected in the present work stress the importance and the efficiency of visual methods in the study of the littoral fish fauna. In situ observations allow to acquire information on species unlikely detectable by other sampling methods, considering their own ecological or behavioural habits. An example is given by fish species, such as blenniids or gobiids, inhabiting a small spatial domain (Francour and Harmelin, 1988; Miniconi *et al.*, 1990; Francour and Finelli, 1991). Riera *et al.* (1995) also stated that the specific habitat (such as crevices or little cavities) and the reduced size of *S. maderensis* can prevent its fishing.

As for the fish assemblage of Ustica Island, the faunistic list coming from literature (De Cristofaro, 1970) is incomplete. Thus, the occurrence in our surveys of some not yet recorded species is mostly due to a scarce knowledge of the reserve ichthyofauna and not to a new colonisation following environmental changes (e.g., oceanographic conditions). However, the occurrence at Ustica of *S. cretense* and *C. crysos* is consistent with the northern extension of the biogeographical range of these thermophilic species, as a result of a warming of Mediterranean waters (see Francour *et al.*, 1994; Riera *et al.*, 1995). In particular, the capture of *S. cretense* by fishermen of the Island during the last few years happened more and more frequently, suggesting an increase in the population density.

As a whole, further studies are needed on the investigated species in relation to habitat preference, ecology and behaviour, being the knowledge about these topics still incomplete. An evaluation of the real population density and the distribution of *S. cretense* along the coasts of Ustica should be the first step to plan future research concerning, for example, the occurrence of reproduction and its effectiveness.

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